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# Description

The invention concerns conveyors and like structures and has more particular reference to structures formed from a multiplicity of spiral elements joined together to interdigitated side-by-side disposition.

In the context of papermachine clothing, with which field the present application is particularly, though not exclusively, concerned, it has been proposed to provide a papermachine felt comprising a multiplicity of spiral elements of synthetic monofilament material joined together in interdigitated disposition by hinge pins.

It is also known from DE—U—7509670 to provide a link conveyor — comprising a base structure, which provides adequate strength in the running direction of the conveyor, and a supplementary structure connected with the base structure, the base and supplementary structures both comprising spiral elements connected together in interdigitated disposition and the spirals of the supplementary structure extending outwardly from the plane defined by the base structure. However, the link conveyor disclosed in the prior document is intended for use in conveying glass articles in an environment of high temperature, and the spirals of the supplementary structure are shaped to form a surface for carrying the articles and to reduce heat transfer from such articles to the link belt.

The object of the invention is to provide a structure, hereinafter for convenience referred to as a 'link conveyor', which term includes structures for use in the contact of papermachine clothing suitable for dryer fabrics, forming fabrics of base structures for press felts, in which the effect of wear or damage on the strength of the conveyor in its running direction is lessened.

According to the present invention a link conveyor including a base structure defined by a respective plurality of spirals hingedly connected together in parallel interdigitated disposition providing adequate strength in the running direction of the conveyor is characterised by a supplementary structure comprising a further respective plurality of spirals connected together in parallel interdigitated disposition and connected with the base structure, the spirals of the supplementary structure extending outwardly beyond the plane defined by the base structure, and being of increased abrasion resistance in relation to those of the supplementary structure being adapted and arranged to protect the base structure against wear.

According to a preferred feature, adjacent spirals of the base structure and the supplementary structure, respectively, are connected together by respective hinge wires.

According to a further preferred feature, the spirals of one at least of the base structure and the supplementary structure comprise synthetic yarns.

According to another preferred feature, the spirals of the supplementary structure extend

outwardly of the base structure at each face thereof.

Accordingly to a still further preferred feature, adjacent ones of the individual pairs of spirals of the supplementary structure are secured together and the base structure and supplementary structure are connected together by pintle wires of the base structure.

The invention will now be described further, by way of example only, with reference to the accompanying drawings, in which:—

Fig. 1 is a diagrammatic perspective view of a part of a known link conveyor;

Fig. 1a is a section on line A—A of Fig. 1;

Fig. 2 is a side elevation of a part of the first embodiment of the invention;

Fig. 3 is a section taken on line C—C of Fig. 2;

Fig. 4 is a diagrammatic side elevation showing a second embodiment of the invention;

Fig. 5 is a view corresponding to Fig. 4 and illustrates a modification of the arrangement shown therein;

Fig. 6 is a diagrammatic illustration of a third embodiment of the invention; and

Fig. 7 is a view corresponding to Fig. 6 and shows a still further embodiment of the invention.

Referring now to the drawings, and more particularly to Figs. 1 and 1a thereof, a conventional link conveyor comprises a plurality of individual spirals 1 of synthetic monofilament yarns arranged in interdigitated disposition, adjacent spirals being of opposite hand and being connected together by respective pintle wires 2 threaded through the tunnel formed thereby.

A embodiment of the invention is illustrated in Figs 2 and 3 and will be seen to comprise a base structure, defined by synthetic monofilament spirals 3, and a supplementary structure, defined by synthetic monofilament spirals 4, having common pintle wires whereby adjacent spirals of both structures are connected together, corresponding spirals 3 and 4 being arranged coaxially as a two start spiral. Alternate spirals both of the base structure of the supplementary structure are of opposite hand.

In order to provide for increased abrasion resistance of the total structure the spirals 3 which constitute the base structure may initially be of like dimensions to those of the supplementary structure but differ therefrom in that upon heat stabilisation, the coils of the base structure assume a lesser vertical dimension, as seen in the drawing, than the supplementary structure. Alternatively, the spirals of the supplementary structure may be produced from a yarn of a greater diameter than those of the base structure, thereby to ensure that the supplementary structure extends outwardly of the base structure.

Any failure of the supplementary structure such as might arise from wear will not adversely affect the integrity of the total structure since adequate strength in the longitudinal direction of the conveyor is provided by the base structure.

Figs. 4 and 5 shows two further embodiments wherein the link conveyor comprises base and

supplementary structures 41, 42 so arranged as to provide a single layer conveyor structure, the two structures each having respective sets of pintle wires 43, 44 with the wires of one set 43 being offset in relation to those of the other 44. One of the interlinked structures provides the necessary degree of strength and dimensional stability, whilst, in the case of the Fig. 4 embodiment, the other is necessarily of improved abrasion resistance. In the case of the embodiment of Fig. 5, the spirals of the supplementary structure 42 are of larger diameter, and thereby protect the spirals of the base structure.

The invention allows of the production of a link conveyor in accordance with Fig. 6 or 7.

In the arrangement shown in Fig. 6, two sets of hingedly connected spirals 10, 11 and 12, 13 are joined together at intervals by pintle wires common to both sets, one set of spirals constituting the base structure, and providing the dimensional stability and strength characteristic of the conveyor, and the other set of spirals providing a wear-resistant supplementary structure to protect the base structure against wear and damage. In the use condition of the conveyor the open configuration illustrated will not obtain, but rather the upper and lower structures will move closer together in the region of the free apices of the open rectangular formation shown. It is to be observed that the upper surface can assist in the conveyance of articles or materials placed thereon by virtue of the transversely ribbed configuration arising from the disposition of the spirals whereas the similar undersurface can co-operate with, say, the ribbed or similar surface of a drive roller to provide a positive drive to the conveyor.

Fig. 7 illustrates a modification of the arrangement shown in Fig. 6, wherein the pintle wires of one structure, as defined by spirals 16, constitute alternate pintle wires of the other structure as defined by spirals 14, 15, the intermediate hinge points of the said other structure being defined by pintle wires unique to that other structure.

In the case of the embodiment shown in Figs. 2 and 3, it is thought preferably that alternate spirals in the or in each respective layer be of opposite hand. However, whilst such arrangement is convenient in that it does much facilitate the assembly of those conveyors of the kind to which the invention relates wherein corresponding parts of the successive turns of adjacent spirals are in closely spaced disposition on the common pintle wire, the invention is not limited to this feature of opposite handedness. It may be found convenient, in some application, for the said corresponding parts to be more widely spaced or for the adjacent spirals to be forced into engagement, in which case adjacent coils can be of like hand. The combination of spirals, as to their handedness, will be determined by reference to the specific requirements of the conveyor and the detailed construction thereof. In any event, the heat setting process to which a conveyor constructed from synthetic monofilament yarns is necessarily subjected will relieve

any stresses imparted into the structure from any distortions created on assembly of seemingly non-compatible spirals.

The invention herein disclosed provides a range of link conveyors of application to a range of industries, wherein the specific requirements of the conveyor as regards strength, stability and wear resistance can readily be achieved by suitable selection of materials and dimensions of the individual spirals. The facility with which the permeability of the structure might be varied to meet specific requirements lends such structures to ready application as a filter medium, drainage mat or the like, and the term "conveyor" is to be construed accordingly. A particular application of the conveyor herein disclosed is in the context of papermachine and like clothing, this being especially so of the embodiments disclosed in Figs. 2 to 4, and Fig. 6. Other applications are seen to lie in the food and allied industries.

Whilst the invention has been disclosed in connection with spirals of synthetic monofilament yarns, other materials, including metallic materials, may be preferred in some instances, as indeed may combinations of spirals of metallic and non-metallic materials. In so far as synthetic yarns are concerned, the preferred material of choice is clearly monofilament, although resin treated or otherwise coated continuous multifilament yarns have been found to be of application.

The invention is not restricted to the exact features of the embodiments hereinbefore described. For example, it is not essential that adjacent spirals be connected together by pintle wires threaded through the interdigitated turns of such spirals, since pairs of spirals of like hand can be connected by mutual engagement in parallel side-by-side disposition simply by pushing one spiral laterally through the other until the opposite inclined turns contact, and the disclosure and claims hereof should be constructed accordingly.

#### Claims

1. A link conveyor including a base structure defined by a respective plurality of spirals hingedly connected together in parallel interdigitated disposition and providing adequate strength in the running direction of the conveyor, and a supplementary structure likewise comprising a respective plurality of spirals, connected together in parallel interdigitated disposition, connected with the base structure, the spirals of the supplementary structure extending outwardly beyond the plane defined by the base structure characterised in that the spirals of the supplementary structure are of increased abrasion resistance in relation to those of the base structure and the supplementary structure is adapted and arranged to protect the base structure against wear.

2. A link conveyor as claimed in claim 1, characterised in that adjacent spirals of the base structure (41) and the supplementary structure (42) respectively are connected together by respective hinge wires (43, 44).

3. A link conveyor as claimed in claim 1 or 2, characterised in that the spirals (3, 4) of one at least of the base structure and supplementary structure comprise synthetic yarns.

4. A link conveyor as claimed in claim 3, wherein the spirals (3, 4) both of the base structure and supplementary structure comprise synthetic yarns.

5. A link conveyor as claimed in claim 3 or 4, characterised in that the synthetic yarn comprises a plastic monofilament.

6. A link conveyor as claimed in any one of the preceding claims, characterised in that the spirals (4) of the supplementary structure extend outwardly from the plane defined by the base structure at each face thereof.

7. A link conveyor as claimed in any one of claims 1 to 6, characterised in that corresponding spirals of the base structure and the supplementary structure are arranged coaxially as a two-start spiral.

8. A link conveyor as claimed in claim 7, characterised in that the spiral (4) of the supplementary structure is of a material of a greater thickness than that of the base structure spiral (3).

9. A link conveyor as claimed in any one of the preceding claims 1 to 6, characterised in that adjacent ones of individual pairs of spirals of the supplementary structure are secured together and the base structure and supplementary structure are connected together by pintle wires of the base structure.

10. Papermachine clothing consisting of or including a link conveyor as claimed in any one of the preceding claims.

#### Patentansprüche

1. Drahtgliederband mit einer Basislage aus mehreren parallel und ineinandergreifend angeordneten und gelenkig miteinander verbundenen Wendeln, die in Laufrichtung des Bandes eine ausreichende Festigkeit aufweist, und mit einer Zusatzlage aus ebenfalls mehreren parallel und ineinandergreifend angeordneten und miteinander verbundenen Wendeln, die mit der Basislage verbunden ist, wobei sich die Wendeln der Zusatzlage über die Ebene der Basislage hinaus nach außen erstrecken, dadurch gekennzeichnet, daß die Wendeln (4, 6) der Zusatzlage eine höhere Abriebfestigkeit als diejenigen der Basislage haben, und daß die Zusatzlage als Schutz der Basislage gegen Abnutzung vorgesehen ist.

2. Drahtgliederband nach Anspruch 1, dadurch gekennzeichnet, daß benachbarte Wendeln der Basislage (41) bzw. Zusatzlage (42) jeweils durch Scharniergelenk-Verbindungsdrähte (43, 44) miteinander verbunden sind.

3. Drahtgliederband nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Wendeln (3, 5, 4, 6) wenigstens der Basis- oder Zusatzlage aus Kunststoff-Drähten bestehen.

4. Drahtgliederband nach Anspruch 3, dadurch gekennzeichnet, daß die Wendeln (3, 5, 4, 6) so-

wohl der Basis- als auch der Zusatzlage aus Kunststoff-Drähten bestehen.

5. Drahtgliederband nach Anspruch 3 oder 4, dadurch gekennzeichnet, daß der Kunststoff-Draht aus monofilem Kunststoff besteht.

6. Drahtgliederband nach einem Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Wendeln (4, 6) der Zusatzlage sich über die Ebene der Basislage bei jeder Stirnfläche derselben nach außen erstrecken.

7. Drahtgliederband nach einem Ansprüche 1 bis 6, dadurch gekennzeichnet, daß entsprechende Wendeln der Basislage und der Zusatzlage coaxial als eine Bifilarwendel angeordnet sind.

8. Drahtgliederband nach Anspruch 7, dadurch gekennzeichnet, daß die Wendel (4) der Zusatzlage aus dickerem Material als die Wendel (3) der Basislage besteht.

9. Drahtgliederband nach einem Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die benachbarten Wendelpaare der Zusatzlage aneinander befestigt sind und daß die Basislage und die Zusatzlage durch Gelenk-Verbindungsdrähte der Basislage miteinander verbunden sind.

10. Papiermaschinensieb aus oder mit einem Drahtgliederband nach einem der obigen Ansprüche.

#### Revendications

1. Transporteur à maillons comprenant une structure de base formée par une série correspondante d'hélices articulées entre elles dans une disposition parallèle entrelacée et fournissant une résistance appropriée dans le sens de déplacement du transporteur, et une structure supplémentaire comprenant de même une série correspondante d'hélices (4, 6) assemblées entre elles dans une disposition parallèle entrelacée et assemblées à la structure de base, les hélices de la structure supplémentaire s'étendant vers l'extérieur au-delà du plan défini par la structure de base, caractérisé en ce que les hélices de la structure supplémentaire ont une résistance à l'abrasion accrue par rapport à celles de la structure de base et la structure supplémentaire est adaptée et agencée pour protéger la structure de base de l'usure.

2. Transporteur articulé suivant la revendication 1, caractérisé en ce que des hélices adjacentes de la structure de base (41) et, respectivement, de la structure supplémentaire (42) sont assemblées entre elles par des fils d'articulation respectifs (43, 44).

3. Transporteur articulé suivant la revendication 1 ou 2, caractérisé en ce que les hélices (3, 4) de l'une au moins de la structure de base et de la structure supplémentaire sont en fils textiles synthétiques.

4. Transporteur articulé suivant la revendication 3, caractérisé en ce que les hélices (3, 4) tant de la structure de base que de la structure supplémentaire sont en fils textiles synthétiques.

5. Transporteur articulé suivant la revendica-

tion 3 ou 4, caractérisé en ce que le fil textile synthétique est un fil à un brin en matière plastique.

6. Transporteur articulé suivant l'une quelconque des revendications précédentes, caractérisé en ce que les hélices (4) de la structure supplémentaire s'étendent à l'extérieur du plan défini par la structure de base sur chaque face de cette dernière.

7. Transporteur articulé suivant l'une quelconque des revendications 1 à 6, caractérisé en ce que des hélices correspondantes de la structure de base et de la structure supplémentaire sont disposées coaxialement à la manière d'une hélice à deux enroulements.

8. Transporteur articulé suivant la revendication 7, caractérisé en ce qui l'hélice (4) de la structure

supplémentaire est en une matière que a une plus grande épaisseur que celle de l'hélice (3) de la structure de base.

9. Transporteur articulé suivant l'une quelconque des revendications 1 à 6, caractérisé en ce que les paires individuelles d'hélices de la structure supplémentaire qui sont adjacentes sont assujetties entre elles et la structure de base et la structure supplémentaire sont assemblées ensemble par des fils de charnière de la structure de base.

10. Toile de machine à papier constituée par ou comportant, un transporteur articulé tel que revendiqué dans l'une quelconque des revendications précédentes.

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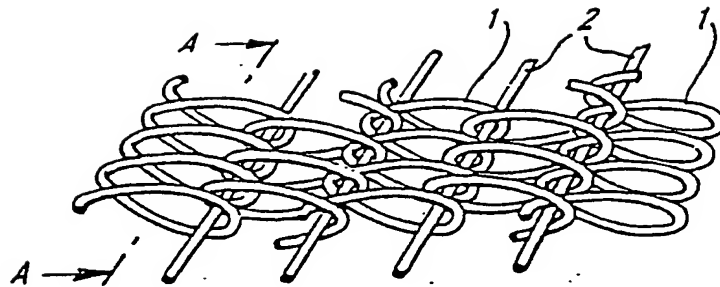


FIG. 1

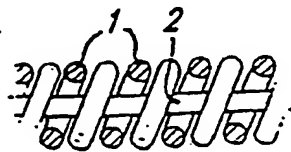


FIG. 1a

